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BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			THOMAS, BRANDI N	
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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/660,626	<b>Applicant(s)</b> WANG ET AL.	
	<b>Examiner</b> Brandi N. Thomas	<b>Art Unit</b> 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on Amendment filed on 2/3/05.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-57 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>Detailed Action</u> .                  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-6, 9-16, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al. (6861339 B2).

Regarding claim 1, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers, comprising the steps of: providing a first layer (16) having a first silicon material (col. 4, lines 29-30); performing a hydrogen treatment on the first layer (16) to form a hydrogenated surface (18) thereon (col. 4, lines 30-31 and 45-49); and forming a second layer (20) having a second silicon material on the hydrogenated surface (18) of the first layer (16) (col. 5, lines 14-16).

Regarding claim 2, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers, wherein the first silicon material (16) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 3, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers, wherein the second silicon material (20) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

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Regarding claim 4, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers, wherein the hydrogen treatment is a hydrogen plasma treatment (col. 4, lines 40-44).

Regarding claim 5, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 200~2000sccm (col. 4, lines 19-20), an operating temperature of 300~400<sup>0</sup>C (col. 4, lines 15-17), an operating time of 30~90 sec (col. 4, lines 54-55) and an operating pressure of 0.1~10 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 6, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 600sccm (col. 4, lines 19-20), an operating temperature of 320<sup>0</sup>C (col. 4, lines 15-17), an operating time of 60 sec (col. 4, lines 54-55) and an operating pressure of 0.8 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions

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of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 200 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 9, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers, wherein the hydrogen plasma treatment (18) and formation of the second layer (20) are preformed in the same processing chamber (col. 5, lines 18-21).

Regarding claim 10, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers in the microelectromechanical structure (MEMS) process, comprising the steps of: providing a first layer (16) having a first silicon material (col. 4, lines 29-30); performing a hydrogen treatment on the first layer (16) to form an H-treated silicon surface with SI-H bonds (18) thereon (col. 4, lines 30-31 and 45-49); and forming a second layer (20) having a second silicon material on the H-treated silicon surface (18) of the first layer (16) (col. 5, lines 14-16).

Regarding claim 11, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers in the microelectromechanical structure (MEMS) process, wherein the first silicon material (16) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 12, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers in the microelectromechanical structure (MEMS) process,

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wherein the second silicon material (20) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 13, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers in the microelectromechanical structure (MEMS) process, wherein the second layer is formed by CVD using  $\text{SiH}_4$  as a reaction gas (col. 4, lines 9-22).

Regarding claim 14, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers in the microelectromechanical structure (MEMS) process, wherein the hydrogen treatment is a hydrogen plasma treatment (col. 4, lines 40-44).

Regarding claim 15, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers in the microelectromechanical structure (MEMS) process, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 200~2000sccm (col. 4, lines 19-20), an operating temperature of 300~400<sup>0</sup>C (col. 4, lines 15-17), an operating time of 30~90 sec (col. 4, lines 54-55) and an operating pressure of 0.1~10 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 16, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers in the microelectromechanical structure (MEMS) process, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 600sccm (col. 4, lines 19-20), an operating temperature of 320<sup>0</sup>C (col. 4, lines 15-17), an operating time of 60 sec (col. 4, lines 54-55) and an operating pressure of 0.8 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 200 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 19, Chen et al. discloses, in figures 3 and 4, a method of preventing peeling between two silicon layers in the microelectromechanical structure (MEMS) process, wherein the hydrogen plasma treatment (18) and formation of the second layer (20) are preformed in the same processing chamber (col. 5, lines 18-21).

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7, 8, 17, 18, 27, 28, 40, 41, 54, and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (6861339 B2) as applied to claims 1, 10, and 20 above, and further in view of Chinn et al. (US 2004/0033639 A1).

Regarding claims 7, 17, 27, 40, and 54, Chen et al. discloses the claimed invention but does not specifically disclose the hydrogen plasma treatment is an HF vapor treatment. However, Chinn et al. discloses a method of preventing peeling between two silicon layers, wherein the hydrogen treatment is an HF vapor treatment (sections 0075 and 0099). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a HF vapor treatment for the purpose of removing the oxide sacrificial layer (section 0075).

Regarding claims 8, 18, 28, 41, and 55, Chinn et al. discloses a method of preventing peeling between two silicon layers, wherein the HF vapor used HF (49wt%) with a ratio of H<sub>2</sub>O: HF = 30:1 ~ 70:1 (section 0076).

5. Claims 20-26 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huibers et al. (6741383 B2) in view of Chen et al. (6861339 B2).

Regarding claim 20, Huibers et al. discloses, in figures 4 and 5A-5C, a method of forming a micromechanical structure, comprising the steps of: providing at least one micromechanical structural layer above a substrate (511), the micromechanical structural layer being sustained between a lower sacrificial silicon layer (512) (col. 9, lines 4-5) and an upper sacrificial silicon layer (514) (col. 9, lines 10-14); and removing the upper and lower sacrificial



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layer (512 and 514) but does not specifically disclose a H-treated silicon surface. However, Chen et al. discloses a H-treated silicon surface (18) (col. 4, lines 30-31 and 45-49). Therefore it would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the method of Huibers et al. with the H-treated silicon surface of Chen et al. for the purpose of forming a gate electrode within an integrated circuit device (col. 2, lines 61-65).

Regarding claim 21, Chen et al. discloses, in figures 3 and 4, a method of forming a micromechanical structure, wherein the lower sacrificial silicon layer (16) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 22, Chen et al. discloses, in figures 3 and 4, a method of forming a micromechanical structure, wherein the upper sacrificial silicon layer (20) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 23, Chen et al. discloses, in figures 3 and 4, a method of forming a micromechanical structure, wherein the upper sacrificial silicon layer (20) is formed by CVD using  $\text{SiH}_4$  as a reaction gas (col. 4, lines 9-22).

Regarding claim 24, Chen et al. discloses, in figures 3 and 4, a method of forming a micromechanical structure, wherein the H-treated surface of the lower sacrificial silicon layer (16) is performed by a hydrogen plasma treatment (col. 4, lines 40-44).

Regarding claim 25, Chen et al. discloses, in figures 3 and 4, a method of forming a micromechanical structure, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 200~2000sccm (col. 4, lines 19-20), an operating temperature of 300~400°C (col. 4, lines 15-17), an operating time of 30~90 sec (col. 4, lines 54-55) and an operating pressure of 0.1~10 torr (col.4, lines 60-61) but does not specifically disclose an RF

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power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 26, Chen et al. discloses, in figures 3 and 4, a method of forming a micromechanical structure, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 600sccm (col. 4, lines 19-20), an operating temperature of 320<sup>0</sup>C (col. 4, lines 15-17), an operating time of 60 sec (col. 4, lines 54-55) and an operating pressure of 0.8 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 200 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 29, Chen et al. discloses, in figures 3 and 4, a method of forming a micromechanical structure, but does not specifically disclose wherein the H-treated surface has

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Si-H bonds. However, Chen et al. does disclose using a hydrogen treatment over a silicon layer. Therefore Si-H bonds would be formed.

6. Claims 30-39, 42-53, 56, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huibers et al. (6741383 B2) in view of Chen et al. (6861339 B2) and further in view of Chinn et al. (US 2004/0033639 A1).

Regarding claim 30, Huibers et al. discloses, in figures 4 and 5A-5C, a method of forming a micromirror structure, comprising the steps of: forming a first sacrificial silicon layer (512) on a substrate (511) (col. 9, lines 4-5); forming a mirror plate (513) on part of the first sacrificial silicon layer (512) (col. 8, lines 53-54 and col. 9, line 5); forming a second sacrificial silicon layer (514) over the mirror plate (513) and the first sacrificial silicon layer (512) (col. 9, lines 10-14); forming at least one hole (516 and 518) penetrating the second sacrificial silicon layer (514), the mirror plate (513) and the first sacrificial silicon layer (512) (col. 9, lines 23-27); filling a conductive material in the hole (516 and 518) to define a mirror support structure (515) attached to the mirror plate (513) and the substrate (511) (col. 9, lines 36-42); and removing the first and second sacrificial layers (512 and 514) to release the mirror plate (513) (col. 9, lines 40-45) but does not specifically disclose performing an inert gas sputtering on the mirror plate and the first sacrificial silicon layer; performing a hydrogen treatment on the first sacrificial silicon layer to form an H-treated silicon surface thereon. Chen et al. discloses, in figures 3 and 4, performing a hydrogen treatment on the first layer (16) to form a hydrogenated surface (18) thereon (col. 4, lines 30-31 and 45-49). Chinn et al. shows that it is known to provide an inert gas sputtering on the mirror plate and the first sacrificial silicon layer (section 0099). Therefore it

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would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the method of Huibers et al. and Chen et al. with the inert gas of Chinn et al. for the purpose of creating bonded hydroxyl groups on to remove residues (section 0099).

Regarding claim 31, Huibers et al. discloses a method of forming a micromirror structure, wherein the substrate (511) is a glass or quartz substrate (col. 8, lines 40-45).

Regarding claim 32, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the lower sacrificial silicon layer (16) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 33, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the upper sacrificial silicon layer (20) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 34, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the upper sacrificial silicon layer (20) is formed by CVD using  $\text{SiH}_4$  as a reaction gas (col. 4, lines 9-22).

Regarding claim 35, Chinn et al. discloses a method of forming a micromirror structure, wherein the inert gas sputtering is argon sputtering (section 0015).

Regarding claim 36, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the hydrogen treatment is a hydrogen plasma treatment (col. 4, lines 40-44).

Regarding claim 37, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 200~2000sccm (col. 4, lines 19-20), an operating temperature

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of 300~400<sup>0</sup>C (col. 4, lines 15-17), an operating time of 30~90 sec (col. 4, lines 54-55) and an operating pressure of 0.1~10 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 38, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 600sccm (col. 4, lines 19-20), an operating temperature of 320<sup>0</sup>C (col. 4, lines 15-17), an operating time of 60 sec (col. 4, lines 54-55) and an operating pressure of 0.8 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 200 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 39, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the hydrogen plasma treatment (18) and formation of the second layer (20) are preformed in the same processing chamber (col. 5, lines 18-21).

Regarding claim 42, Huibers et al. discloses a method of forming a micromirror structure, wherein the mirror plate is an ONO (oxide-metal-oxide) layer (col. 7, lines 25-27).

Regarding claim 43, Huibers et al. discloses a method of forming a micromirror structure, wherein the conductive material comprises at least one of W, Mo, Ti, and Ta (col. 9, lines 46-52).

Regarding claim 44, Huibers et al. discloses, in figures 4 and 5A-5C, a method of forming a micromirror structure, comprising the steps of: forming a first sacrificial silicon layer (512) on a substrate (511) (col. 9, lines 4-5); forming a mirror plate (513) on part of the first sacrificial silicon layer (512) (col. 8, lines 53-54 and col. 9, line 5); forming a second sacrificial silicon layer (514) over the mirror plate (513) and the first sacrificial silicon layer (512) (col. 9, lines 10-14); partially etching the first and second sacrificial silicon layers (512 and 514) to create an opening exposing a portion of the mirror plate (513) (figure 5B) and at least one hole (516 and 518) exposing a portion of the substrate (col. 9, lines 23-27); filling a conductive material in the opening (figure 5B) and the hole (516 and 518) to define a mirror support structure (515) attached to the mirror plate (513) and the substrate (511) (col. 9, lines 36-42); and removing the first and second sacrificial layers (512 and 514) to release the mirror plate (513) (col. 9, lines 40-45) but does not specifically disclose performing an inert gas sputtering on the mirror plate and the first sacrificial silicon layer; performing a hydrogen treatment on the first sacrificial silicon layer to form an H-treated silicon surface thereon. Chen et al. discloses, in

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figures 3 and 4, performing a hydrogen treatment on the first layer (16) to form a hydrogenated surface (18) thereon (col. 4, lines 30-31 and 45-49). Chinn et al. shows that it is known to provide an inert gas sputtering on the mirror plate and the first sacrificial silicon layer (section 0099). Therefore it would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the method of Huibers et al. and Chen et al. with the inert gas of Chinn et al. for the purpose of creating bonded hydroxyl groups on to remove residues (section 0099).

Regarding claim 45, Huibers et al. discloses a method of forming a micromirror structure, wherein the substrate (511) is a glass or quartz substrate (col. 8, lines 40-45).

Regarding claim 46, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the lower sacrificial silicon layer (16) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 47, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the upper sacrificial silicon layer (20) is amorphous silicon or crystalline silicon (col. 6, lines 28-30 and 50-53).

Regarding claim 48, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the upper sacrificial silicon layer (20) is formed by CVD using  $\text{SiH}_4$  as a reaction gas (col. 4, lines 9-22).

Regarding claim 49, Chinn et al. discloses a method of forming a micromirror structure, wherein the inert gas sputtering is argon sputtering (section 0015).

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Regarding claim 50, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the hydrogen treatment is a hydrogen plasma treatment (col. 4, lines 40-44).

Regarding claim 51, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 200~2000sccm (col. 4, lines 19-20), an operating temperature of 300~400<sup>0</sup>C (col. 4, lines 15-17), an operating time of 30~90 sec (col. 4, lines 54-55) and an operating pressure of 0.1~10 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 52, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein operational conditions of the hydrogen plasma treatment comprises a hydrogen gas flow of 600sccm (col. 4, lines 19-20), an operating temperature of 320<sup>0</sup>C (col. 4, lines 15-17), an operating time of 60 sec (col. 4, lines 54-55) and an operating pressure of 0.8 torr (col.4, lines 60-61) but does not specifically disclose an RF power of 50~300 Watts. It would have been obvious to modify the hydrogen plasma treatment to include an RF power of 50~300 Watts, since it has been held that where the general conditions of a claim are



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disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hydrogen plasma treatment to include an RF power of 200 Watts for the purpose of defining a plasma processing system suitable for treatment of the hydrogen.

Regarding claim 53, Chen et al. discloses, in figures 3 and 4, a method of forming a micromirror structure, wherein the hydrogen plasma treatment (18) and formation of the second layer (20) are preformed in the same processing chamber (col. 5, lines 18-21).

Regarding claim 56, Huibers et al. discloses a method of forming a micromirror structure, wherein the mirror plate is an ONO (oxide-metal-oxide) layer (col. 7, lines 25-27).

Regarding claim 57, Huibers et al. discloses a method of forming a micromirror structure, wherein the conductive material comprises at least one of W, Mo, Ti, and Ta (col. 9, lines 46-52).

### *Response to Arguments*

7. Applicant's arguments with respect to claims 1-57 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

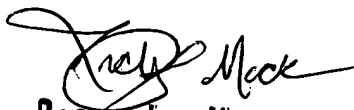
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brandi N. Thomas whose telephone number is 571-272-2341.

The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
BNT

  
RICKY L. MACK  
PRIMARY EXAMINER